

The illegal exploitation of the Javan Leopard (*Panthera pardus melas*) and Sunda Clouded Leopard (*Neofelis diardi*) in Indonesia

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Abstract

Indonesia is home to the Javan Leopard (*Panthera pardus melas*) and the Sunda Clouded Leopard (*Neofelis diardi*), both of which are threatened by habitat loss, human-wildlife conflict issues and the illegal wildlife trade. Leopards and clouded leopards are threatened by the illegal wildlife trade across their range, however, very little is known of the illegal trade in these two species in Indonesia, or of the efforts made to tackle this crime. Both the Javan Leopard and Sunda Clouded Leopard are protected species in Indonesia and both species are listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), meaning commercial international trade is generally prohibited. To better understand the trade, and efforts to end this trade, we collected records of seizures and prosecutions relating to Javan Leopards and Sunda Clouded Leopards in Indonesia for the period 2011–2019. Despite both species being protected by law, this study reveals the prevalence of extensive poaching, illegal domestic trade and international trafficking of both species. A total of 41 seizure records were obtained from 2011 to 2019, which was estimated to amount to approximately 83 animals, which likely represents only a fraction of the total number of cases and therefore the risk may be substantially greater. Approximately half of the cases resulted in successful prosecution and of these, the highest sentence given was 2 years in jail and a fine of IDR50mil (–USD3300). The majority of the penalties handed down for these crimes were far below the maximum potential penalties and are unlikely to be effective deterrents.

Keywords

Big cats, conservation, crime, Java, poaching, wildlife trade

Introduction

The Indonesian archipelago is made up of a diverse landscape that supports a large proportion of the Earth's fauna and flora including a high number of endemic species (Meijaard et al. 2005; von Rintelen et al. 2017). The country has extremely high biodiversity and for precisely this reason, it is also one of the most significant illegal wildlife trade hubs globally (Samedi and Iskandar 2000; Shepherd 2010; Lyons and Natusch 2012; Chng and Eaton 2016; Gomez and Shepherd 2019). Indonesia is both a source and end use destination for a wide range of species, many of which are threatened with extinction (Samedi and Iskandar 2000; Shepherd and Magnus 2004; Meijaard et al. 2012; Shepherd et al. 2015; Morgan and Chng 2017; Gomez et al. 2017; Nijman et al. 2018). Further rare, endemic and range-restricted species are frequently in high demand in the international commercial market for exotic pets (Courchamp et al. 2006; Nijman and Stoner 2014; Janssen and Shepherd 2018). Two species of high conservation concern that continuously feature in seized wildlife shipments in Indonesia are the Javan Leopard (*Panthera pardus melas*) and the Sunda Clouded Leopard (*Neofelis diardi*), though there is very little documentation or published literature pertaining to their exploitation. Both species are assessed by the IUCN Red List of Threatened Species (hereafter referred to as the Red List) as being threatened with extinction and have a restricted range, making them extremely vulnerable to exploitation.

The Javan Leopard is considered one of the most threatened subspecies of Leopard (Wibisono et al. 2018) and among the most threatened of all big cats. Endemic to the island of Java in Indonesia, deforestation and habitat conversion have significantly depleted wild populations and greatly reduced the species range which is now limited to fragmented and isolated pockets of forested areas around the island (Wibisono et al. 2018; Stein et al. 2020). According to Wilting et al. (2016), only 5% of the island is actually habitable for the species. The conservation status of this species was last assessed in 2008 as Critically Endangered by the Red List, with fewer than 250 mature breeding adults and reported populations in decline (Stein et al. 2020). The main threats to the species are habitat loss and prey base depletion (Stein et al. 2020) which is resulting in increasing human conflict as Leopards prey on livestock or pets (Partasmita et al. 2016; Wilting et al. 2016).

The Sunda Clouded Leopard is only found on the island of Borneo (encompassing Brunei, the Malaysian states of Sabah and Sarawak, and Kalimantan, Indonesia) and the island of Sumatra, Indonesia. The species was recognised as a separate species from the Clouded Leopard *N. nebulosa*, in 2008 based on distinct differences in molecular and morphological data (Buckley-Beason et al. 2006; Kitchener et al. 2006). Wilting et al. (2011), further designated populations of Sunda Clouded Leopard on Borneo and those on Sumatra as two distinct subspecies i.e. Bornean Clouded Leopard *N. d. borneensis* and Sumatran Clouded Leopard *N. d. diardi*. On a global scale the species is assessed as Vulnerable by the Red List, with populations reported as declining across their range predominantly due to forest loss and degradation (Hearn et al. 2015), but on a subspecies level, both are classified as Endangered (Hearn et al. 2008; Sunarto

et al. 2008). Poaching is also noted as a threat in some parts of its range (Hearn et al. 2016), and it is suspected that poaching for commercial trade in Indonesia may be a key threat.

The “Act of the Republic of Indonesia No.5 of 1990 concerning conservation of living resources and their ecosystems”, widely known as the “Conservation Act (No.5) 1990”, is the principal legislation pertaining to the regulation of wildlife trade in Indonesia. Under this Act, species are categorised as either “Protected” or “Unprotected”. Protected species are listed under “Government Regulation No.7, 1999, Concerning the preservation of flora and fauna”. Protected species are not allowed to be caught, injured, killed, kept, possessed, cared for, transported, or traded whether alive or dead. Exceptions in this regard are permitted by the Government for the purposes of research, science and/or safeguarding a species. Violation of this Act can result in imprisonment for a maximum of five years and a fine of up to IDR100 million (~USD6700). Both the Javan Leopard and Sunda Clouded Leopard are classified as Protected species in Indonesia. Under “Government Regulation No. 8, 1999 concerning the utilization of wild plants and animals”, the trade of a Protected species is permitted if the specimens are captive-bred. Captive-bred animals are subject to regulations under the “Decree of the Ministry of Forestry, No.P.19/Ministry of Forestry-II/2005 concerning captive management of wild plant and animal species” and Article 10 in “Government Regulation No. 8, 1999”, defines that only second and subsequent generations of captive-bred Protected animals may be traded, and that all breeders must be registered with the Ministry of Environment and Forestry’s Department of Forest Protection and Nature Conservation (KKH) (for exporters) and Nature Conservation Agency (BKSDA) (for breeders supplying to exporters, but not exporting themselves). At an international level, both species are also listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which means any commercial international trade in wild animals is effectively prohibited.

In this study, we examined seizure data involving these two species in Indonesia to gain an understanding of the extent of the trade and of the efforts being made to tackle this crime. We provide documented evidence of the trade which can be used to better assess the conservation status of remaining populations and identify appropriate measures to mitigate illegal exploitation of both species.

Methods

We collected records of seizures and prosecutions relating to Javan Leopards and Sunda Clouded Leopards in Indonesia for the period 2011–2019. Data were extracted from various sources including from media reports, published literature and the government website, Sistem Informasi Penelusuran Pekara (SIPP) (an open access information database of the courts for each district). Online searches for related seizures were conducted in both English (search terms: Javan Leopard, Sunda Clouded Leopard, leopard followed by seizures, hunting, killing, trade) and Indonesian (search

terms: macan, macan tutul, macan dahan, neofelis, macan kumbang and panthera). We only included records where Indonesia is reported as the location of the seizure in the analysis or reported as the origin of shipment seized elsewhere. All reported seizures and prosecutions were carefully checked to avoid duplication.

From each record, we extracted information on date of seizure, species seized (assumed to be accurately reported), commodity (live animals, paws, skull, skin, etc), quantities of each commodity, purpose of hunting/trade (i.e. for consumption, pets, trophies, etc), location of seizures and trafficking routes, suspects arrested and prosecution outcomes. Using the seizure data, we mapped important trade hubs and centres where trade exists. We have estimated a minimum number of Javan Leopards and Sunda Clouded Leopards recorded in trade from commodities seized, by either counting whole or near-whole specimens seized (e.g. live animals, skins), or by tallying quantities of body parts seized (e.g. claws, teeth, paws, skull) that form one whole individual per seizure record. In terms of tallying body parts, a leopard is naturally assumed to have four paws, 18 claws and four canines.

Due to inherent biases in the way seizure data are reported (given varying levels of law enforcement, reporting and recording practices, language biases, etc.), this dataset is interpreted with caution. Reported seizures are likely to represent only a fraction of the illegal trade and so underestimate its full extent (Burgess et al. 2014; Nijman 2015). As such, the dataset presented here is not to be assumed as representing absolute trafficking trends or volumes.

Results

A total of 41 seizure records were obtained involving Javan Leopards and Sunda Clouded Leopards in Indonesia from 2011 to 2019, which was estimated to amount to approximately 83 animals (i.e. 51 Javan Leopards; 32 Sunda Clouded Leopards). There were no seizure data found for 2013. At least 3 of these incidents were considered retaliatory killings of Javan Leopards that had entered villages or preyed on livestock and pets. The majority of obtained seizure records involved the Javan Leopard with 24 incidents involving an estimated 51 animals while the Sunda Clouded Leopard was reported in 18 incidents involving an estimated 32 animals. The greatest number of seizures were recorded in 2019 (10 seizures) followed by 2015 (9 seizures) and 2018 (8 seizures) (Fig. 1).

The most frequent commodity seized throughout the study period were skins (seized in 18 incidents which encompassed whole specimens, pieces or items for which skin had been used in accessories e.g. bag, hat and Reog art (used in traditional Indonesian dance) (Table 1, Fig. 1). This was followed by the seizure of live animals (9 incidents) and taxidermy products (8 incidents). The most abundant commodity seized were canines amounting to 30 pieces in 6 incidents that occurred in 2018 and 2019. Overall, body parts consisting of canines, claws, paws, skin and skulls along with taxidermy products made up the greatest percentage of commodities seized (Fig. 1).

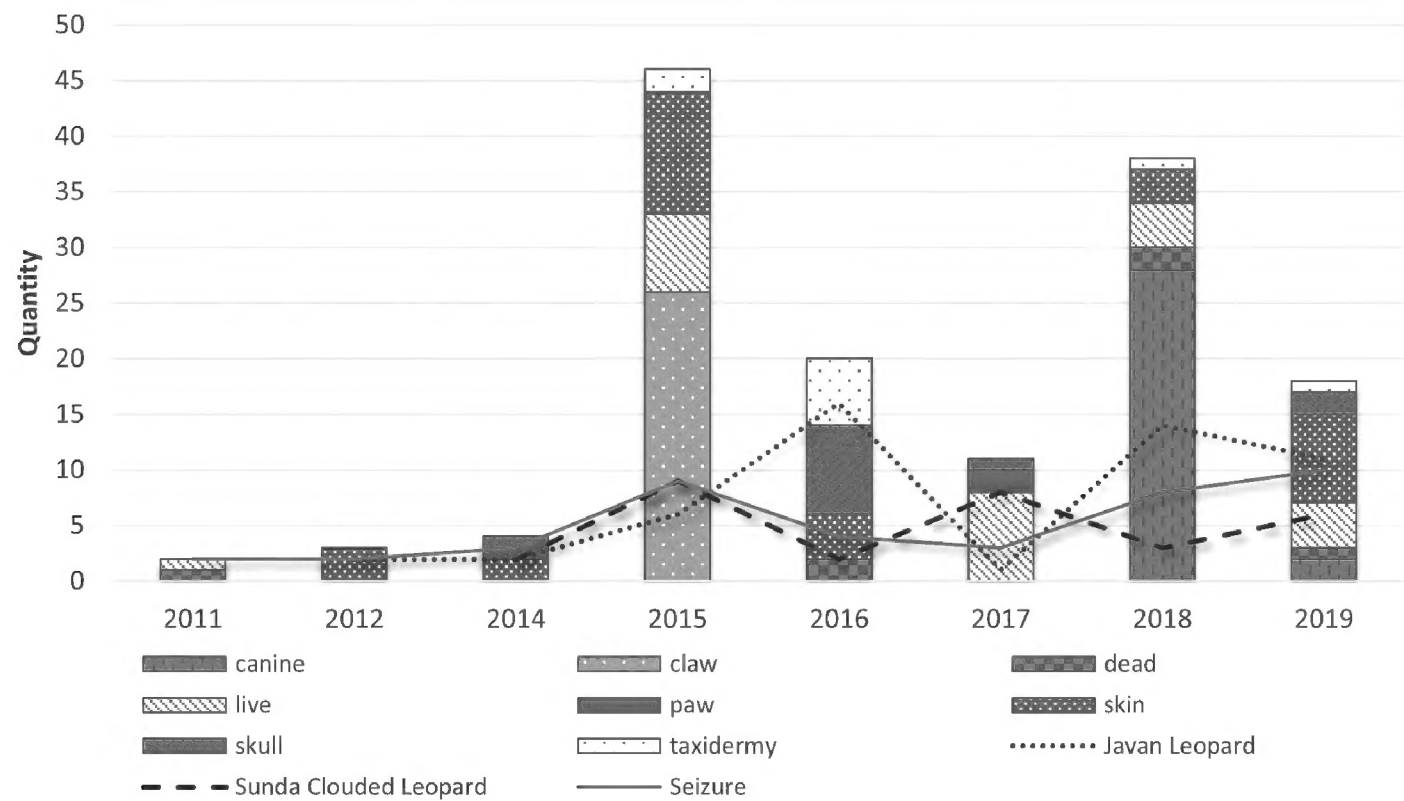


Figure 1. The number of seizures (grey line) obtained for Indonesia that involved either the Javan Leopard or the Sunda Clouded Leopard in Indonesia from 2011 to 2019 (no data for 2013) based on data extracted from media sources, published literature, CITES Trade Database, Indonesian government website (SIPP), etc., including various commodities seized (e.g. live, skin, canines, claws, taxidermy, etc) (bar graph) with an estimated number of both leopard species involved based on commodities seized per record (dotted lines).

Table 1. The various types of commodities from Javan Leopard and Sunda Clouded Leopard seized in Indonesia from 2011 to 2019 including the frequency of each commodity seized and quantities.

Commodity	Seizure (#)		Quantity	
	Javan Leopard	Sunda Clouded Leopard	Javan Leopard	Sunda Clouded Leopard
canine	3	3	20	10
claw	1	1	22	4
dead	3	2	4	2
live	3	6	6	17
paw	1		2	
skins				
– skin (pieces)	5	5	12	6
– skin (head)	1		2	
– skin (whole)	3	1	7	1
– other (bag, hat, Reog art)	2	1	2	1
skull	5		13	
taxidermied	5	3	7	3

All seizure records obtained, with the exception of 2, occurred in Indonesia (39 incidents) i.e. the islands of Java (18 incidents), Sumatra (18 incidents) and Kalimantan (3 incidents) (Fig. 2). The province of West Java and Jakarta, located on the island of Java, appear to be trade hotspots with 7 and 6 incidents obtained for each location respectively. That said, it should also be noted the lack of, or fewer, seizures in other locations could reflect poorer enforcement effort.

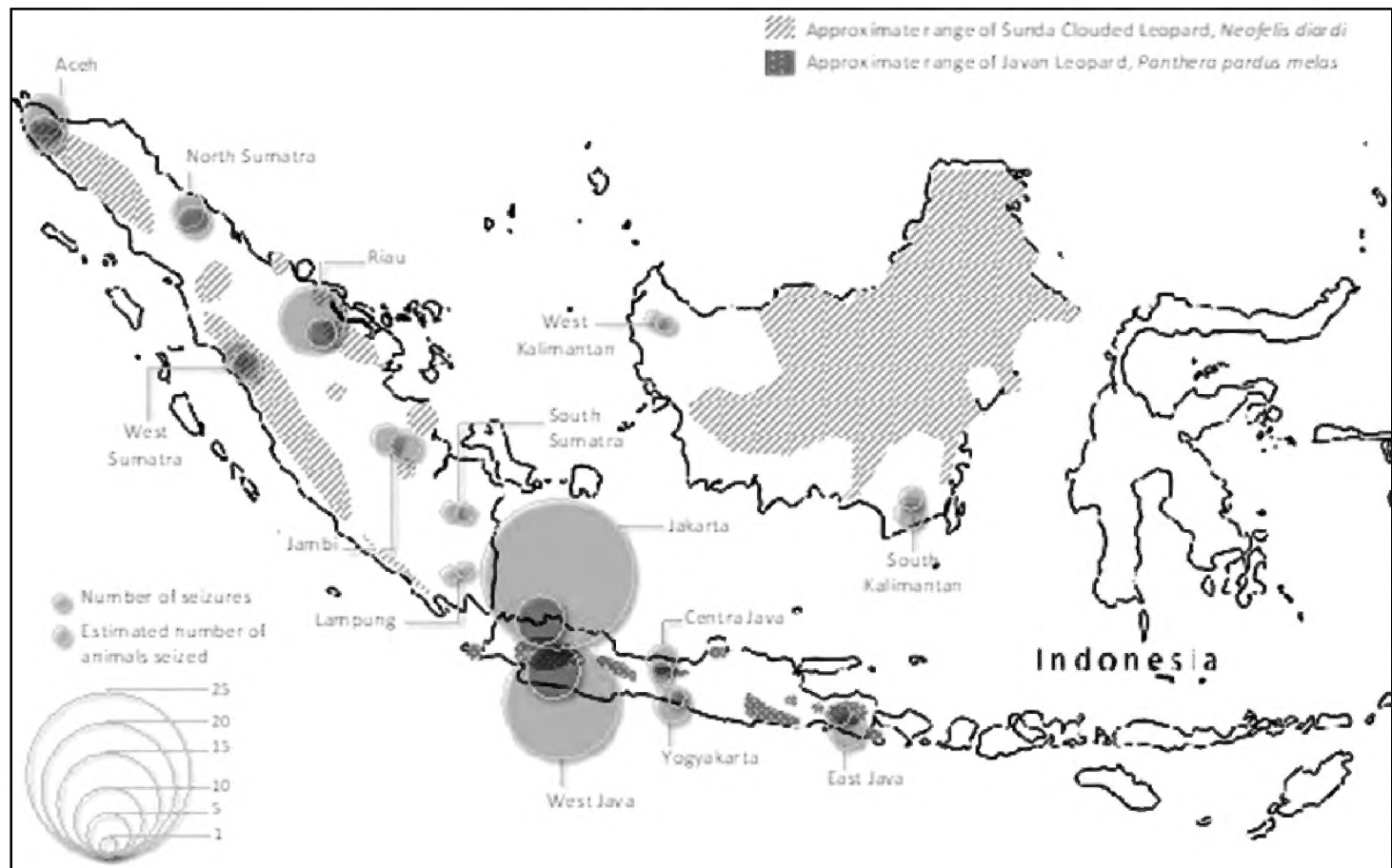


Figure 2. Location of seizure incidents involving Javan Leopard and Sunda Clouded Leopard that occurred in Indonesia from 2011 and 2019. Locations are grouped by provinces in Indonesia. A total of 41 seizure incidents were obtained of which 39 are mapped out above. The remaining two incidents occurred in Russia and UK respectively with origins reported as Indonesia. Approximate range for both species is extracted from the IUCN Red List of Threatened Species (Hearn et al. 2015; Stein et al. 2020).

The international trafficking of both species from Indonesia occurred in 3 incidents. Two incidents involved the Javan Leopard: one occurred in Russia and one in the UK but with origins of seized shipments reported as Indonesia. The seizure in the UK occurred in 2014 and involved 2 leopard skulls among various wildlife items seized while the incident in Russia occurred in 2015 involving various live animals from Indonesia including a Javan Leopard destined for the pet trade. The third incident occurred in Jakarta in 2015 involving a live Sunda Clouded Leopard ordered by a buyer in Kuwait.

At least 31 of the seizure incidents included multiple species seized along with Javan Leopard and Sunda Clouded Leopard, including live animals, body parts or taxidermy/ preserved animal parts. Tigers (*Panthera tigris*) (in 17 seizures) and Sun Bears (*Helarctos malayanus*) (in 13 seizures) were the most frequent species seized together with both species.

Of the 41 seizure records obtained, we could only find successful prosecution records for 20 cases (48.8%; 10 cases involving Sunda Clouded Leopard, 9 cases involving Javan Leopard, and 2 cases involving both species) involving 29 suspects (Table 2). The highest sentence given was 2 years in jail and IDR50mil (~USD3550) fine to a trader caught in 2018 for possession of 4 canines belonging to a Sunda Clouded Leopard and a bag made from the skin of a Sunda Clouded Leopard. Remaining convictions ranged from 1–1.6 years with fines (7 cases, 15 suspects) to <1 year with fines (11 cases, 12 suspects).

Table 2. The number of arrests and convictions (20 cases) involving Javan Leopard and Sunda Clouded Leopard in Indonesia, 2011–2019 based on the Indonesian government website (SIPP).

Date	Seizure location	Species	Commodity	Quantity	Other species seized	No. of suspects arrested	Prosecution
11-Dec 2011	West Sumatra	SCL	dead	1	None	1	9 months in jail + IDR5 million (~USD355) fine or additional 1 month in jail.
19-Dec 2012	Riau	JL	skin (pieces)	2	Tiger skins, Sun Bear head, deer skull, deer skin, goat head, monkey heads and Leopard Cat (<i>Prionailurus bengalensis</i>) heads	1	3 months in jail + IDR1 million (~USD70) fine or additional 1 month in jail.
3-Jan 2014	Aceh	SCL	skin (pieces); skull	1	body parts of Tiger, Golden Cat, Leopard Cat, Sumatran Serow (<i>Capricornis sumatraensis</i>), hornbill, Sun Bear	2	1 year in jail + IDR10 million (~USD700) fine or additional 4 months in jail
20-May 2014	West Kalimantan	SCL	skin (pieces)	1	body parts – species not specified	1	2 months + 10 days in jail + IDR500 thousand (~USD35) or additional 1 month in jail
6-Nov 2015	Jakarta	SCL	live	1	live gibbon, birds of paradise, Sun Bear	5	1.6 years in jail + IDR10 million (~USD700) fine or additional 3 months in jail – 4 SUSPECTS 1.3 years in jail + IDR10 million (~USD700) fine or additional 3 months in jail – 1 SUSPECT
14-Oct 2015	Lampung	SCL	skin (pieces)	1	Sun Bear, Leopard Cat	3	1.6 years in jail + IDR50 million (~USD3550) fine or additional 1 months in jail – 1 SUSPECT 1 year in jail and IDR50 million (~USD3550) fine or additional 3 months in jail – 2 SUSPECTS
16-Sep 2015	West Sumatra	SCL	claw	4	body parts – species not specified	1	6 months in jail + IDR100 million (~USD7100) fine or additional 1 month in jail.
30-Jul 2015	West Java	JL	claw; skin (pieces); leopard skin hat	22; 5; 1	body parts of marine turtles, deer, Tiger, mouse deer, Sunda Pangolin (<i>Manis javanica</i>), Asian Elephant (<i>Elephas maximus</i>), Sun Bear, birds of paradise	1	3 months in jail + IDR1 million (~USD70) fine or additional 1 month in jail.
15-Jan 2016	Jakarta	JL SCL	skin (whole); skin (pieces); taxidermy; skulls taxidermy	1; 3; 3; 8 1	taxidermy parts of Sumatran Serow, deer, Sun Bear, python, Tiger, Golden Cat (<i>Catopuma temminckii</i>), birds of paradise, parrots, eagle and Bali Starling (<i>Leucopsar rothschildi</i>)	1	1 year in jail + IDR50 million (~USD3550) fine or additional 1 month in jail.
2-Aug 2016	Jambi	SCL	taxidermy	1	taxidermy parts of Sunda Pangolin, Leopard Cat, Golden Cat, Chital (<i>Axis axis</i>), Sambar Deer (<i>Rusa unicolor</i>), Tiger	2	8 months in jail + IDR1 million (~USD70) fine or additional 1 month in jail – 1 SUSPECT No SIPP record for SUSPECT 2
3-Oct 2017	South Kalimantan	JL	head; paw	1; 2	None	1	2 years in jail + IDR50 million (~USD3550) fine or additional 3 months in jail*
22-Feb 2017	Riau	SCL	live	7	Black Eagle (<i>Ictinaetus malaiensis</i>), langurs, otters	2	1.2 years in jail + IDR25 million (~USD1700) fine or additional 1 month in jail – 1 SUSPECT 8 months in jail + IDR50 million (~USD3550) fine or additional 2 months in jail – 1 SUSPECT

Date	Seizure location	Species	Commodity	Quantity	Other species seized	No. of suspects arrested	Prosecution
29-Jan 2018	North Sumatra	SCL SCL	canine leopard skin bag	4 1	body parts of Tigers, Sun Bears	1	2 years in jail + IDR50 million (~USD3550) fine or additional 2 months in jail.
11-May 2018	South Kalimantan	SCL	canine; skin (pieces)	5; 2	Sun Bear, deer	1	1 year in jail + IDR5 million (~USD355) fine or additional 2 months in jail.
11-Apr 2018	Jakarta	JL	canine	18	body parts of Sun Bear, Tiger, Lion	1	9 months in jail + IDR50 million (~USD3550) fine or additional 1 month in jail
21-Nov 2018	West Java	JL	canine	1	body parts of Tiger, elephant accessories	1	8 months in jail + IDR10 million (~USD700) fine or additional 1 month in jail.
23-Apr 2018	Jambi	JL	taxidermy	1	taxidermy parts of Tiger, Sun Bear, Common Muntjac (<i>Muntiacus muntjac</i>), Binturong (<i>Arctictis binturong</i>), deer	1	1 month in jail + IDR5 million (~USD355) fine or additional 1 month in jail.
5-Aug 2019	Yogyakarta	JL SCL	skin (whole); skull canine	2; 1 1	Reog art made from Tiger skins, peafowl feathers, deer antlers	1	1.6 years in jail + IDR2 million (~USD140) fine or additional 2 months in jail.
29-Nov 2019	Central Java	JL	skin (pieces); skull	1; 1	live peafowl	1	9 months in jail + IDR500 thousand (~USD35) or additional 1 month in jail.
30-Oct 2019	Central Java	JL	canine	1	body parts of babirusa (<i>Babyrusa</i> sp.), deer, hornbill, Tiger, Sun Bear	1	7 months in jail + IDR10 million (~USD700) fine or additional 1 month in jail.

Note: JL: Javan Leopard, SCL: Sunda Clouded Leopard. *Sentence suggested by the court: the actual sentence given was unknown. Conversion to USD is based on exchange rate of USD1=IDR14,059 (<https://www1.oanda.com/currency/converter/>; 10 June 2020).

Discussion

Based on the analyzed seizure data from 2011 to 2019, there is a substantial illegal trade in the Javan Leopard and the Sunda Clouded Leopard in Indonesia. The trade in both species predominantly supplies a demand for wildlife trophies and ornaments as illustrated by the fact that mostly body parts, particularly skins, as well as taxidermy products were seized. This corresponds to findings of Partasasmita et al. (2016) which revealed targeted hunting of the Javan Leopard by a village community in Sukabumi, West Java, due to an increased demand for animal skins and other valuable body parts, as well as other studies in Asia that reveal the availability of leopard skins of various species in wildlife markets (D'Cruze and Macdonald 2015; Nijman and Shepherd 2015; Ghimirey and Acharya 2020), indicating the demand for and their value as trophies/ornaments. In a study on the global trade in clouded leopards, Indonesia was frequently cited as a source country of concern particularly in reference to the trade in skins, meat and bones (D'Cruze and Macdonald 2015). Trade in body parts of both species could also be feeding a demand for traditional medicine. For example, leopard skin is used in Indonesia to treat skin disease (Partasasmita et al. 2016). In fact, much like the Tiger, almost every part of the leopard is used in traditional medicine – meat and bones are used to enhance male strength and virility, ash from burnt hair for foot and mouth disease, liver and bile as an antibiotic, brain for lung and heart disease, heart for asthma, while teeth, claws and tongue are prized as amulets/charms (Partasasmita et al. 2016). This raises further concerns as leopards are increasingly being used as substitutes for Tigers, which are locally extinct in many parts of their range and fast depleting in others (Raza et al. 2012). The data also revealed live individuals of both species exploited for the exotic pet trade (9 incidents and 23 animals, i.e., 6 Javan Leopards and 17 Sunda Clouded Leopards). Three of these incidents reported cubs seized, two of which occurred as recently as 2019 in Sumatra: one incident took place in Riau where two suspects were arrested for trying to smuggle one Javan Leopard cub, four Lion (*Panthera leo*) cubs and close to 60 Indian Star Tortoises (*Geochelone elegans*) and the other in Aceh, where a villager was caught trying to sell two Sunda Clouded Leopard cubs.

Aside from the clear intention of illegal exploitation of both species for trade, there were at least three cases involving the retaliatory killing of Javan Leopards that reportedly wandered into villages or preyed on livestock. All three incidents occurred in West Java involving at least seven animals. In two of the incidents, the leopards were either shot or poisoned, but the bodies were not found by the authorities (only pictures posted of the dead leopards). In the third incident, a leopard was caught by locals in the Ciamis-Garut area citing human-leopard conflict. When authorities came to retrieve the animal, the locals asked for money before they would hand over the animal. This had reportedly happened a few times in this area, and authorities were suspicious as this was generally coordinated by one individual person. These three incidents raise doubts as to the genuine nature of these conflicts and suggest that to some extent, loopholes in the law are being exploited (i.e. authorities overlook the killing of leopards

if they are deemed to be a threat to human life or livestock) to harvest these protected species for trade. Human-leopard conflict in Indonesia is reportedly becoming more frequent due to increasing fragmentation and loss of suitable habitat as well as depleting prey base (Partasasmita et al. 2016; Gunawan et al. 2017; Wibisono et al. 2018). This presents a significant conservation threat to the Javan Leopard and potentially the Sunda Clouded Leopard if not resolved urgently and further complicates efforts to eradicate illegal trade in these species.

Our study also reveals the international trafficking of both species from Indonesia to Kuwait, Russia and the UK, in violation of national legislation and CITES regulations. This was derived from three seizure incidents, two of which involved live animals for the pet trade, and one involving skulls. Live individuals of both species were despatched to Kuwait and Russia. In the first incident, the seizure took place in Jakarta in 2015 and involved a Sunda Clouded Leopard that was being smuggled to Kuwait. This was part of a larger investigation into the international trafficking of wildlife (including orangutan, Sun Bear, birds of paradise) sourced from Sumatra and Indonesian Papua to Middle Eastern countries. The second incident occurred in Russia in 2015, where a woman was caught at the Domodedovo Airport with plastic boxes containing animals sourced from wildlife markets in Indonesia including a live Javan Leopard. The incident of leopard skulls occurred in the UK in 2014, where an illegal wildlife trader was caught for selling two leopard skulls and 134 primate parts on e-Bay which had reportedly been sourced from a wildlife trader based in East Java. Given the close proximity to the Malaysian States of Sabah and Sarawak, cross border trade in these species between Indonesia and Malaysia should be considered a possibility as well.

The Javan Leopard and Sunda Clouded Leopard are strictly protected under Indonesia's national laws and by international regulations, yet this study reveals the prevalence of poaching, illegal domestic trade and international trafficking of both species. More than half of seizure incidents obtained were a result of intel and further investigation by enforcement authorities. Most of the seizure data (with the exception of 7 incidents) involved numerous wildlife species seized and not just leopards. This included high-profile species such as Tigers (41% of seizure incidents obtained for this study) and orangutans (in 2 incidents) as well as various other wildlife encompassing birds, deers, gibbons, pangolin, serow, snakes, slow loris, bears and turtles. This indicates enforcement efforts are not specifically targeted at Sunda Clouded Leopards or Javan Leopards but rather focused on dismantling Tiger poaching rings or general wildlife smuggling syndicates. This in itself suggests that true trade or poaching levels are vastly underestimated. The ongoing poaching and commercial trade is a conservation concern as both the Javan Leopard and the Sunda Clouded Leopard are highly threatened species and even low levels of removal could have major repercussions on remaining populations. For instance, recent studies on the distribution and population size of the Sunda Clouded Leopard in Borneo failed to detect the species in some areas and suggest that the species occurs in extremely low densities (Hearn et al. 2019). Approximately half of the cases resulted in successful prosecution and of these, the

highest sentence given was 2 years in jail and a fine of IDR50mil (~USD3300) to a wildlife trader caught in 2018 for attempting to sell 4 canines belonging to a Sunda Clouded Leopard, a bag made from the skin of a Javan Leopard and parts from Tigers and Sun Bears. All four species are strictly protected for which the maximum penalty afforded by Indonesia's wildlife laws is 5 years in prison and a fine of IDR100mil (~USD6700). Remaining convictions ranged from <1–1.6 years with fines ranging from IDR500,000 to IDR1mil (~USD35-70). The penalties handed down for these crimes are hardly deterrents and it is not known why maximum penalties as provided for under Indonesian law are not utilised further considering that multiple highly vulnerable and protected species are involved in these incidents and that such low penalties undermine enforcement efforts.

Conclusion

Poaching for commercial trade is pushing many wild cat species to the brink of extinction across their range in Asia (D'Cruze and Macdonald 2015; Nijman and Shepherd 2015; Nijman et al. 2019). The hunting of wildlife, particularly by indigenous communities for ceremonial clothing, food, medicine, protective charms and hunting trophies, has traditionally always been part of Indonesian culture (Meijaard 1999). However, hunting motives have since evolved, e.g., from one of subsistence to being commercially driven due to high commodity value (Meijaard 1999; Bennet and Robinson 2000; Harrison et al. 2016; Voigt et al. 2018). This, combined with modern hunting methods (including indiscriminate snaring), increasing accessibility of forests and increasing human-wildlife conflict, has resulted in significant detrimental impacts on wildlife populations across Asia (Gray et al. 2018; Symes et al. 2018), including Indonesia (Gunawan et al. 2017; Wibisono et al. 2018). Indonesia also has a notorious reputation for illegal and/or unsustainable trade in wild and exotic animals as pets, both as a source and demand country, involving a tremendous diversity and abundance of species (Nijman et al. 2009; Shepherd 2010; Harris et al. 2017; Morgan and Chng 2017; Gomez and Bouhuys 2018), including wild cats (Nijman et al. 2019). Over-harvesting of wildlife for the pet trade has been persistently raised as a key threat to Indonesia's biodiversity, particularly when it involves rare, endemic and restricted range species (Nijman and Stoner 2014; Janssen and Shepherd 2018), such as the Javan Leopard and Sunda Clouded Leopard. Hence, the illegal exploitation of the Javan Leopard and the Sunda Clouded Leopard for trade in Indonesia should be considered a significant threat to both species because of their threatened status in the wild (i.e. both species populations are small, in decline and vulnerable to extinction) and considering the dataset underrepresents true trade volumes.

We recommend further research into the drivers behind the poaching and trade in Javan Leopards and Sunda Clouded Leopards, including a focus on the links between human-wildlife conflict and trade. We encourage the Government of Indonesia to ramp up efforts to prioritise this issue and to investigate and dismantle

criminal networks involved in the commercial trade in both species and their parts and derivatives. We strongly suggest penalising offenders involved in the poaching and commercial trade in these species in Indonesia to the full extent of the law to create a deterrent. Cases resulting in prosecutions should be highlighted in the media to assist in raising awareness of the conservation plight these two species face as well as to educate the public regarding the legislation and penalties in place to prevent poaching and illegal trade. Finally, further monitoring of the poaching and trade in the Javan Leopard and Sunda Clouded Leopard, and of the efforts made to eradicate these crimes should continue to measure progress and to aid in informing future conservation and enforcement efforts.

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